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The postjunctional effects and neural release of purine compounds in the guinea-pig vas deferens.

Westfall DP, Stitzel RE, Rowe JN.

The smooth muscle of the in vitro guinea-pig vas deferens was shown to contract upon addition of adenosine triphosphate (ATP), adenosine diphosphate (ADP), and adenosine monophosphate (AMP), the order of potency being ATP greater than ADP greater than AMP. Adenosine did not produce contraction. Pretreatment of animals with reserpine or treatment of tissues with an alpha-adrenoceptor blocking agent failed to alter the dose-response relationship for ATP. Because ATP is both a potent contractile agent and is present in the adrenergic storage complex, evidence was sought for the role of ATP as a possible co-transmitter following neural stimulation. Tissues preincubated in 3H-adenosine, a procedure which results in the incorporation of label into 3H-adenine nucleotides in the vas deferens, released significant amounts of tritium upon transmural stimulation. Because contraction per se can contribute to the tritium overflow, experiments were conducted with bathing solution made hypertonic with sucrose (12.5%). Hypertonic solution prevented the electrically induced tissue contraction, but failed to prevent a tetrodotoxin-sensitive release of tritium from tissue preincubated with either 3H-norepinephrine or 3H-adenosine. Because of the known association of ATP with norepinephrine in synaptic vesicles of adrenergic nerves and in view of the present evidence of a postjunctional action of ATP as well as the release of tritium from 3H-adenosine-treated vasa deferentia, it seems possible that in this tissue ATP, in addition to its other functions, may serve as a co-transmitter with norepinephrine.

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